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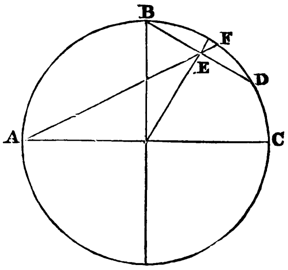
NOTICES OF NEW WORKS.

Popular Tables arranged in a new Form, giving Information at Sight for ascertaining, according to the Carlisle Table of Mortality, the Value of Lifehold, Leasehold, and Church Property, Renewal Fines, &c., the Public Funds, Annual Average Price and Interest on Consols from 1731 *to* 1858; *also various interesting and useful Tables, equally adapted to the Office and the Library Table.* By CHARLES M. WILLICH, Actuary and Secretary to the University Life Assurance Society. Fourth edition. London: Longman, Brown, Green, and Longmans; 1859.

WE have already called attention to former editions of this publication.* It has now, as will be seen, reached a fourth edition; and, considering the variety and utility of the information which it contains, we cannot say that we are surprised at it—notwithstanding the fact that comparatively few persons are very conversant with such matters as are herein treated of. The title explains so fully the nature of the contents that it is hardly necessary for us to further specify them; but there are one or two particulars not referred to in the title which are, from our point of view, of great interest, and to which we shall therefore beg leave to direct the attention of our readers. The first is the table at page 92, exhibiting the alterations in the Bank of England discounts. These alterations are given side by side with the price of consols, the amount of bullion, and that of the circulation; and notes are added of the occurrence of the great events which most materially affect these quantities. The reader is accordingly enabled to see at a glance how a change in any one of them operates as regards the others, and has thus very useful materials for forming an opinion as to their mutual relationship. The other particular we shall notice is the ingenious method given by the author of approximating to the quadrature of the circle. In his own words, it is as follows, and is, we think, quite worthy of record in these pages:—



"Let A B be a quadrant of a circle A B C. In the arc B C, place a chord B D, equal to the radius, so that the arc B D is one of 60°. Bisect B D in E; join A E, and produce the joining line to meet the circumference in F. Then A F differs from the side of a square equal in area to the circle by somewhat more than the one four-thousandth part of that side.

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* *See* vol. iii., page 341.

"The amount of error, which is about the $\frac{1}{3747}$ part of the side of the square, may be thus shown:—

Let the radius$=1$. Then $xy=(1+\cos 30^\circ)(1-\cos 30^\circ)=\frac{1}{4}$.
The line A E $=x$.
„ E F $=y$.
„ A F $=x+y$.

$$x^2=1+\cos^2 30^\circ+\cos 30^\circ=1+\tfrac{3}{4}+\frac{\sqrt{3}}{2}=\frac{7+2\sqrt{3}}{4}.$$

$$\therefore\ x=\tfrac{1}{2}\sqrt{7+2\sqrt{3}}=1{\cdot}6174131827,\ \&c.$$

$$y=\frac{1}{4x}=\frac{1}{2\sqrt{7+2\sqrt{3}}}={\cdot}1545678016,\ \&c.$$

$$x+y=\tfrac{1}{2}\left\{\sqrt{7+2\sqrt{3}}+\frac{1}{\sqrt{7+2\sqrt{3}}}\right\}=\tfrac{1}{2}\,\frac{8+2\sqrt{3}}{\sqrt{7+2\sqrt{3}}}=$$

$$=\frac{4+\sqrt{3}}{\sqrt{7+2\sqrt{3}}}=1{\cdot}7719809844,\ \&c.$$

But when the diameter is 2, the area is 3·141592653,
&c., and the square root is . . . . . 1·77245385, &c.

which is the side of a square equal to the area of the circle.

According to the diagram, the line A F is the side of
a square, by calculation found to be . . . 1·77198098, &c.

The difference between the sides of the squares is . ·00047287, &c.

So that the side determined by this simple geometrical construction differs in defect from the truth by only $\frac{1}{3747}$ of itself."

This approximation was thought worthy of notice by the Royal Society, and was communicated to that learned body by Professor Stokes. It seems to us that, from its simplicity and proximate accuracy, it must be of considerable use in practical mechanics and engineering. Altogether, the book comprises a vast amount of useful information, and a very ample index affords the means of getting at it with great readiness.

Theory of Compound Interest and Annuities, with Logarithmic Tables. By FEDOR THOMAN, of the Société Crédit Mobilier of Paris. London: Lockwood & Co.; 1859.

THIS little work, apparently written in our language originally by a foreigner, is edited anonymously by an Englishman, as it would seem. It contains, in a compact form and very neat type, the information usually found in works on the subject, and has some original tables for finding the values of annuities when the interest and annuity are not paid within the same intervals of time. The author is evidently well acquainted with the theory of his subject, and from his position has had ample means of studying it practically. He has dedicated his book to the Prince de Joinville.